Demography (2014) 51:173–184
DOI 10.1007/s13524-013-0252-y

A Reversal in the Relationship of Human Development With Fertility?

Kenneth Harttgen · Sebastian Vollmer

Published online: 6 November 2013

Abstract Myrskylä et al. (2009) found that the relationship between the human development index (HDI) and the total fertility rate (TFR) reverses from negative (i.e., increases in HDI are associated with decreases in TFR) to positive (i.e., increases in HDI are associated with increases in TFR) at an HDI level of 0.86. In this article, we show that the reversal in the HDI-TFR relationship is robust to neither the UNDP's recent revision in the HDI calculation method nor the decomposition of the HDI into its education, standard-of-living, and health subindices.

Keywords Fertility · Human development index · Education · Health · Standard of living

Electronic supplementary material The online version of this article (doi:10.1007/s13524-013-0252-y) contains supplementary material, which is available to authorized users.

K. Harttgen (✉)
Nadel, ETH Zürich, Clausiusstr. 37, CLD, 8092 Zurich, Switzerland
e-mail: harttgen@nadel.ethz.ch

S. Vollmer
Department of Economics, University of Göttingen, Platz der Göttinger Sieben 3, 37073 Göttingen, Germany
e-mail: svollmer@uni-goettingen.de

S. Vollmer
Department of Global Health and Population, Harvard School of Public Health, 677 Huntington Avenue, Boston, MA 02115, USA

Introduction

In a paper published in *Nature*, Myrskylä, Kohler, and Billari (MKB) documented a reversal in the relationship between the total fertility rate (TFR) and the Human Development Index (HDI) at advanced levels of human development (Myrskylä et al. 2009). They found that the HDI-TFR relationship reverses from negative (i.e., increases in HDI are associated with a decrease in fertility) to positive (i.e., increases in HDI are associated with increases in fertility) at an HDI level of 0.86. Their analysis was rigorous, but it left open questions that we strive to answer here.

The UNDP recently revised the methodology used to calculate the HDI (cf. UNDP 2010). Several countries approached the maximum value of 1 under the previous HDI, making it difficult to make distinctions in this cluster of countries and to measure further progress of these countries. The UNDP adjusted the goalpost for the index in order to lower overall HDI values. In addition, the new HDI has a built-in preference for equal progress in all three components of the HDI—health, education, and standard of living—through averaging them with a geometric mean instead of an arithmetic mean. The revision led to a reduction of the HDI level across countries, but had only a moderate impact on the ranking of countries. MKB's result is based on the old HDI, and we aim to discover whether it holds for the new one.

MKB conducted their analysis only for the composite HDI index, rather than separately for the three HDI components: health, education, and standard of living. Thus, questions remain: Does the relationship between the TFR and development reverse for all components? Are there different thresholds for each HDI component at which the relationship reverses? Which component, if any, is driving the result for the composite index?

MKB used annual data from 1975 to 2005 in their longitudinal analysis. Until 2000, the HDI was measured every five years. Thus, their data set is largely based on constructed or imputed observations. The analysis can be conducted without imputing data. Rather than using one-year intervals from 1975 to 2005, one could use five-year intervals for the same period in the longitudinal analysis. Alternatively, one could redo the longitudinal analysis with annual data from 2000 to 2009. Whether MKB's result holds for these different samples remains an open question.

Further, MKB removed from the longitudinal analysis all countries that did not have a 2005 HDI level above the observed point of reversal. We examine whether their result holds if these countries are retained in the sample.

Data

We use HDI data from the International Human Development Indicators database (UNDP 2011). The database contains the HDI and its components based on the

new methodology for 187 countries between 1980 and 2010.[1] Data are available every five years for the period 1980 to 2000; data are available every year for 2000 onward.

TFR data come from the World Development indicators (WDI) and are available for every year between 1980 and 2009.[2] We exclude city-states from the sample, as MKB did.[3] The final sample contains 158 countries with five-year data from 1980 to 2000 and annual data from 2000 to 2009.

We define six different country samples to check the robustness of MKB's results. First, we use the same sample of countries as MKB with five-year data from 1980 to 2009. Second, we use the same sample of countries as MKB with annual data from 2000 to 2009. Data for the total balanced sample of 87 countries in 2009 are presented in Table 1.[4] Countries that appear in italics also belong to MKB's balanced sample (which consists of 29 countries).[5] Third, we take a balanced sample of all countries for which we have five-year data from 1980 to 2009. Fourth, we take a balanced sample of all countries in the data set for which we have annual data from 2000 to 2009. Fifth, we use an unbalanced sample of all countries with five-year data from 1980 to 2009. Sixth, we use an unbalanced sample of all countries with annual data from 2000 and 2009.[6] Arguably, the annual sample from 2000 and 2009 is much more important than the five-year sample from 1980 to 2000 because the increase of fertility rates in rich countries is a rather recent phenomenon. Figures 1 and 2 show the relationship between the HDI, its components, and the TFR in 2009. Figure 2 is based on a rescaled HDI analogous to the figure presented by MKB.[7] For 2009 (old HDI 2005), Fig. 2 seems to confirm that the TFR starts to increase at a higher level of human development, resulting in an J-shaped relationship. No such relationship can be identified for 1980. The clear visual pattern is largely driven by the rescaling of the data. Figure 1 shows the same data displayed on the natural scale of the variables. In Fig. 1, no J-shaped relationship between fertility and human development is observable.

[1] The revision of the HDI mostly had a level effect. Changes in the country rankings were moderate. In the MKB sample, the average absolute change was three positions in 2005.

[2] The use of the period TFR is subject to an ongoing debate among demographers. The TFR is a rather volatile and possibly misleading indicator because of tempo effects. Although we agree that tempo effects are important, they are not the focus of this note. We study the robustness of MKB's main result and thus use the same indicator as MKB.

[3] We exclude Hong Kong, Macao, Monaco, and Singapore from the analysis.

[4] Data for 1980 can be found in Table S1 of Online Resource 1.

[5] The original MKB sample is presented in Table S2 in Online Resource 1.

[6] The unbalanced sample consists of 157 countries, which are listed in the footnote of Table S1. The unbalanced sample of countries includes countries for which some data points are missing but that are nevertheless important for the analysis—for example, Germany and many low-fertility countries from Eastern and Central Europe.

[7] MKB rescaled HDI and TFR as follows: HDI rescaled $= -\log(1 - \text{HDI})$ and TFR rescaled $= \log(0.4886 \cdot \text{TFR})/31$.

Table 1 Fertility, HDI, and HDI component values in 2009, by country

Country	TFR	HDI	Edu Index	GNP Index	Health Index	Country	TFR	HDI	Edu Index	GNP Index	Health Index	Country	TFR	HDI	Edu Index	GNP Index	Health Index
Norway	1.98	0.94	0.94	0.90	0.96	*Argentina*	2.23	0.77	0.76	0.69	0.88	Honduras	3.20	0.60	0.54	0.48	0.83
Australia	1.90	0.93	1.00	0.84	0.98	Latvia	1.31	0.77	0.80	0.68	0.84	Indonesia	2.15	0.59	0.53	0.48	0.81
New Zealand	2.14	0.90	1.00	0.77	0.96	Panama	2.52	0.75	0.71	0.67	0.88	Morocco	2.31	0.56	0.43	0.51	0.82
United States	2.05	0.90	0.89	0.87	0.94	Saudi Arabia	2.89	0.75	0.65	0.77	0.84	Nicaragua	2.67	0.56	0.49	0.42	0.85
Ireland	2.07	0.89	0.92	0.82	0.95	Mexico	2.36	0.75	0.68	0.68	0.89	Guatemala	4.05	0.56	0.42	0.52	0.80
Netherlands	1.79	0.89	0.87	0.85	0.95	Bulgaria	1.57	0.74	0.74	0.65	0.85	India	2.66	0.51	0.42	0.45	0.70
Canada	1.67	0.89	0.86	0.84	0.96	Malaysia	2.67	0.74	0.69	0.68	0.86	Pakistan	3.50	0.49	0.36	0.43	0.74
Sweden	1.94	0.88	0.86	0.83	0.97	Trinidad/Tobago	1.64	0.73	0.65	0.77	0.79	Congo	5.90	0.48	0.47	0.45	0.53
Japan	1.37	0.88	0.84	0.82	1.00	Costa Rica	1.88	0.72	0.63	0.64	0.93	Kenya	4.76	0.46	0.52	0.35	0.55
Switzerland	1.50	0.87	0.80	0.84	0.98	Peru	2.54	0.72	0.73	0.60	0.85	Bangladesh	2.30	0.46	0.39	0.34	0.74
Israel	2.96	0.87	0.87	0.79	0.97	Mauritius	1.50	0.70	0.61	0.67	0.82	Ghana	4.24	0.46	0.52	0.33	0.58
Finland	1.86	0.87	0.84	0.82	0.95	Venezuela	2.52	0.70	0.59	0.67	0.85	Cameroon	4.56	0.46	0.48	0.40	0.50
France	2.00	0.87	0.82	0.82	0.97	Ecuador	2.52	0.69	0.64	0.60	0.87	Benin	5.37	0.43	0.36	0.34	0.66
Iceland	2.23	0.87	0.87	0.77	0.98	Jamaica	2.36	0.69	0.67	0.58	0.82	Togo	4.16	0.42	0.45	0.25	0.68
Belgium	1.84	0.86	0.83	0.82	0.95	Colombia	2.40	0.68	0.63	0.61	0.84	Nepal	2.81	0.42	0.34	0.30	0.75
Denmark	1.84	0.86	0.84	0.83	0.93	Tunisia	2.05	0.68	0.61	0.59	0.86	Lesotho	3.27	0.42	0.49	0.38	0.40
Spain	1.40	0.86	0.82	0.80	0.97	Jordan	3.80	0.68	0.67	0.55	0.84	Senegal	4.90	0.41	0.32	0.37	0.57
Greece	1.52	0.85	0.83	0.79	0.94	Turkey	2.11	0.67	0.55	0.67	0.82	Cote d'Ivoire	4.52	0.39	0.29	0.35	0.60
Italy	1.41	0.85	0.79	0.80	0.97	Algeria	2.31	0.67	0.61	0.60	0.83	Zambia	6.23	0.39	0.43	0.32	0.42
Luxembourg	1.59	0.85	0.74	0.88	0.95	Fiji	2.70	0.67	0.76	0.50	0.78	Rwanda	5.40	0.38	0.37	0.30	0.49
Austria	1.39	0.85	0.77	0.83	0.95	China	1.61	0.66	0.59	0.57	0.84	Malawi	5.99	0.38	0.38	0.26	0.54
United Kingdom	2.00	0.85	0.78	0.82	0.94	El Salvador	2.28	0.65	0.61	0.57	0.82	Sudan	4.48	0.38	0.23	0.38	0.61

Table 1 (continued)

Country	TFR	HDI	Edu Index	GNP Index	Health Index	Country	TFR	HDI	Edu Index	GNP Index	Health Index	Country	TFR	HDI	Edu Index	GNP Index	Health Index
Malta	1.44	0.81	0.76	0.75	0.95	Thailand	1.60	0.65	0.59	0.59	0.78	Sierra Leone	5.08	0.31	0.29	0.24	0.44
United Arab Emirates	1.79	0.81	0.65	0.91	0.91	Gabon	3.29	0.64	0.61	0.66	0.65	CAR	4.72	0.31	0.30	0.23	0.43
Cyprus	1.49	0.81	0.74	0.76	0.95	Philippines	3.19	0.63	0.63	0.49	0.82	Mali	6.36	0.30	0.21	0.30	0.46
Hungary	1.32	0.80	0.85	0.72	0.85	Paraguay	3.00	0.63	0.61	0.51	0.82	Mozambique	4.99	0.28	0.20	0.25	0.45
Bahrain	2.57	0.80	0.74	0.78	0.88	Botswana	2.80	0.63	0.66	0.67	0.56	Burundi	4.47	0.28	0.32	0.13	0.49
Portugal	1.32	0.79	0.70	0.75	0.93	Egypt	2.78	0.61	0.53	0.55	0.80	Niger	7.12	0.26	0.16	0.22	0.51
Chile	1.88	0.78	0.75	0.67	0.93	Guyana	2.29	0.60	0.65	0.46	0.75	Zimbabwe	3.36	0.12	0.52	0.01	0.41

Note: Countries are sorted by HDI. The sample includes all countries for which data from 1980 to 2009 are available. Countries in italics are those used by Myrskylä et al. (2009) for their longitudinal analysis.

Source: UNDP (2011); World Bank (2011); and authors' calculations.

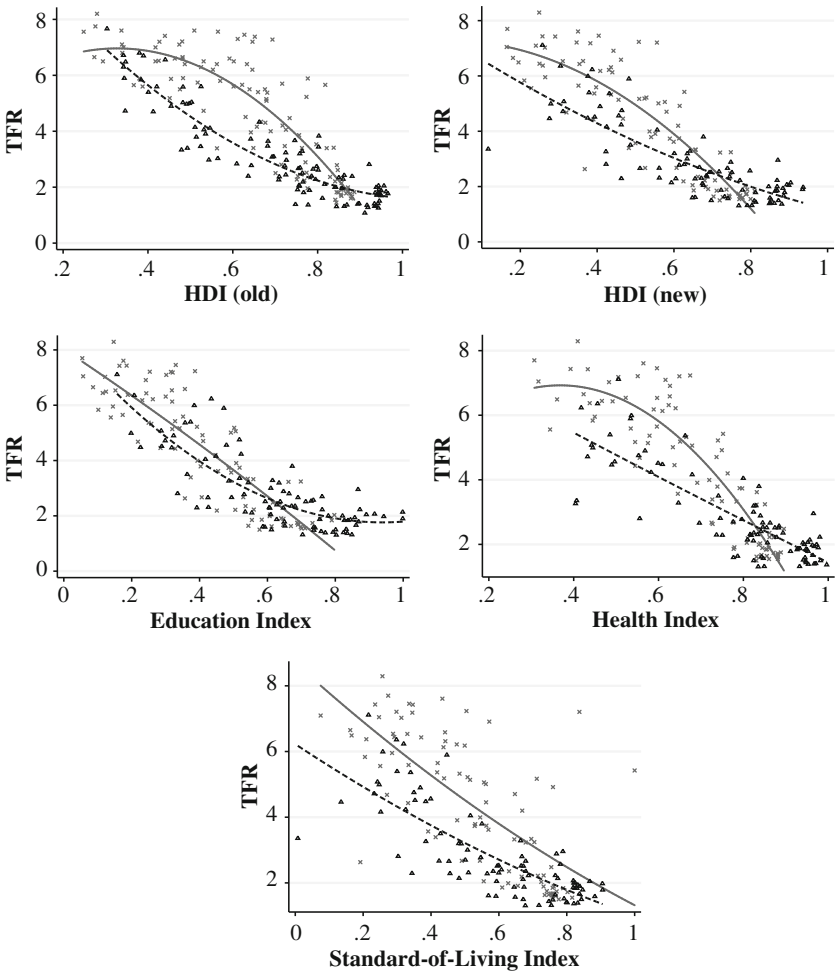

Fig. 1 Relationship between HDI, its components, and fertility (natural scale). Triangles and dashed lines refer to the year 1980 (1975 for the old HDI). Crosses and solid lines refer to the year 2009 (2005 for the old HDI)

Estimation Approach

We fully adopt MKB's difference-in-differences estimation strategy. Specifically, we estimate a piecewise linear model with the TFR as the dependent variable, in which the coefficient of the HDI (or its components) can differ below or above a predetermined threshold value.[8]

$$\begin{aligned}\Delta TFR_{it} = \; & \alpha \Delta B_{it}^{post} + \beta^{pre} \Delta X_{it}^{pre} + \beta^{post} \Delta X_{it}^{post} + \Delta \gamma_t + \Delta \epsilon_{it}, \\ & i = 1, ..., n; t = 1, ..., T. \end{aligned} \tag{1}$$

[8] See the online supplement for Myrskylä et al. (2009) for a more detailed description.

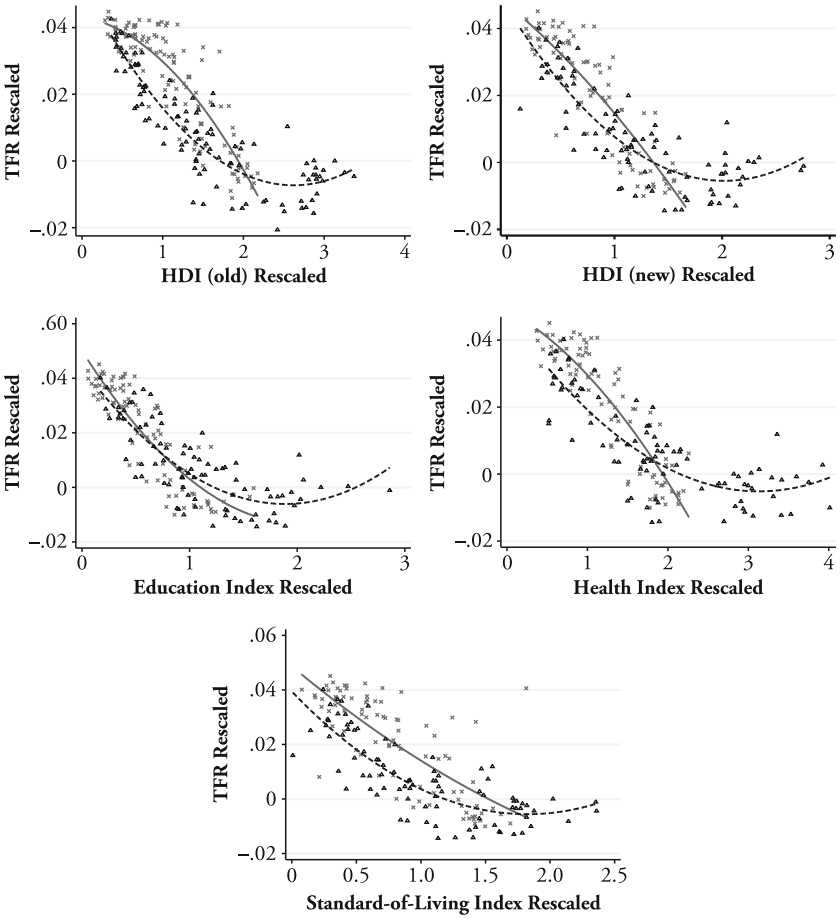

Fig. 2 Relationship between HDI, its components, and fertility (rescaled). Triangles and the dashed lines refer to 1980 (1975 for the old HDI). Crosses and the solid lines refer to 2009 (2005 for the old HDI). HDI rescaled = –log(1 – HDI) and TFR rescaled = log(0.4886 · TFR)/31. Education index: Australia 2009 (0.999), New Zealand 2009 (0.998). Health index: Japan 2009 (0.996). *Sources:* UNDP (2011); World Bank (2011)

The coefficients β^{pre} and β^{post} measure the effect of human development below and above (respectively) a predetermined threshold value on the TFR. X_{it} is the HDI (or one of the HDI components) of country i in year t. The operator Δ is the difference indicator, with $\Delta X_t = X_t - X_{t-1}$, $\Delta X_{it}^{pre} = B_{it}^{pre} \Delta X_{it}$, and $\Delta X_{it}^{post} = B_{it}^{post} \Delta X_{it}$. B_{it}^{pre} and B_{it}^{post} are dummy variables indicating whether the HDI (or HDI component) level is, respectively, below and above the predetermined threshold value. γ_t are time fixed effects. The specification in Eq. (1) allows us to test whether the reversal in the relationship of fertility and the HDI (or HDI component) is statistically significant while controlling for time and country fixed effects. MKB found $\beta^{pre} < 0$ and $\beta^{post} > 0$ for their data set. Before we can estimate Eq. (1), we first have to

determine the threshold value of the HDI (or HDI component). Again, we adopt MKB's empirical strategy and use maximum likelihood methods to determine the threshold. Specifically, we estimate Eq. (1) for a broad range of potential threshold values of the HDI (or HDI component).[9] We take the HDI (or HDI component) value for which the log-likelihood function shows its maximum.[10] The threshold value is also used to define B_{it}^{pre} and B_{it}^{post}. The distribution of the log-likelihood function and the threshold values of the HDI for our six different samples is shown in Fig. S1 in Online Resource 1. Figures S2–S5 show the log-likelihood for the old HDI and the components of the new HDI.

Estimation Results

The regression Tables 2 and 3 include results for the six samples described in the Data section: the Nature sample, the balanced sample, and the unbalanced sample for both five-year data and annual data.[11]

In the upper part of Table 2, we replicate MKB's results for the old HDI.[12] For all samples, the likelihood is greatest for a threshold value around 0.85. For HDI levels above the threshold value, an increase in the HDI is associated with an increase in the TFR. This result is highly significant for all samples. Below the threshold value, an increase in the HDI is associated with a decrease in the TFR (with exception of the Nature sample).

We now turn to the new HDI. The results are shown at the bottom of Table 2. The log-likelihood for various threshold values are shown in Fig. S1 in Online Resource 1. For the Nature sample, we find threshold values of 0.74 and 0.80, respectively. These values are comparable to the threshold values that we found for the old HDI (considering the level and ranking differences between the old and new HDIs). However, MKB's main result—namely, that increases of the HDI above the threshold value lead to increases of the TFR—is now insignificant. For the five-year data, we also find a threshold value of 0.74 for both the balanced and the unbalanced sample. The relationship between the HDI and the TFR is again statistically significant and negative below the threshold value and positive above it. For the annual data, we find an implausibly low threshold value of 0.56. The relationship is statistically significant and negative below the threshold value and positive above it. Because very different threshold value are identified depending on the sample, it is very difficult to draw any conclusions about the period during which the reversal occurred (if it occurred at all). Countries with an HDI value around 0.56 in 2000 include China, Egypt, and Namibia; countries with an HDI value around 0.74 in 2000 include Argentina, Estonia, and Poland. These countries

[9] We use all values between 0.01 and 0.99, with a step size of 0.01, as potential thresholds.

[10] The estimation of the threshold value depends on the underlying sample of countries. MKB excluded countries that had not reached an HDI of 0.85 in 2005. Because we use different samples of countries, we provide a robustness check on this selection criterion when estimating the threshold value.

[11] For the old HDI, we use the data MKB used.

[12] The log-likelihood for various threshold values is shown in Fig. S2 in Online Resource 1.

Table 2 Regression results: Difference-in-differences

	(1) Nature Sample 5-Year Interval (balanced)	(2) Nature Sample Annual (balanced)	(3) Total Sample 5-Year Interval (balanced)	(4) Total Sample Annual (balanced)	(5) Total Sample 5-Year Interval (unbalanced)	(6) Total Sample Annual (unbalanced)
Old HDI	1975–2005	1975–2005	1975–2005	1975–2005	1975–2005	1975–2005
Pre	−1.722	−1.586*	−1.691**	−1.682**	−0.971†	−0.589*
	(3.077)	(1.197)	(0.786)	(0.334)	(0.630)	(0.296)
Post	7.495**	4.073**	14.88**	10.64**	14.90**	10.86**
	(2.526)	(1.042)	(1.430)	(0.934)	(1.291)	(0.876)
Observations	210	1,051	630	3,120	774	3,913
R^2	.383	.244	.603	.450	.598	.435
Threshold value	0.850	0.860	0.850	0.860	0.851	0.860
New HDI	1980–2009	2000–2009	1980–2009	2000–2009	1980–2009	2000–2009
Pre	−10.44**	−2.842**	−2.375**	−4.489**	−1.526**	−4.765**
	(2.583)	(1.364)	(0.849)	(0.816)	(0.656)	(0.759)
Post	0.561	1.052	9.387**	2.354**	10.23**	2.659**
	(1.132)	(0.838)	(1.102)	(0.634)	(0.922)	(0.606)
Observations	196	319	522	1,143	703	1,283
R^2	.444	.287	.604	.399	.583	.417
Threshold value	0.74	0.80	0.74	0.56	0.74	0.56

Note: Robust standard errors are in parentheses.

Sources: UNDP (2011); World Bank (2011); authors' calculations.

$^{\dagger}p < .10$; $*p < .05$; $**p < .01$

are at very different stages of their fertility transition, and not all of them are examples of advanced economies with increasing fertility rates since 2000.[13]

Changes in the index composition between the old HDI and the new HDI made the main result of Myrskylä et al. (2009) disappear in their own country sample and led to an implausible result in the balanced and unbalanced samples. In Table 3, we present the results for the three HDI subindices.[14] For the education index, we find an implausibly low threshold value of 0.45 in the Nature sample with five-year data. The relationship between the education index and the TFR is negative below the

[13]The results are not driven by outliers. MKB identified Estonia, Kuwait, South Korea, and Malta as outliers. In a robustness check, we omitted these countries from the sample and obtained essentially the same results.

[14]The log-likelihood of the various threshold values of the piecewise linear regressions for the HDI subindices is shown in Figs. S3–S5 in Online Resource 1.

Table 3 Regression results: Difference-in-differences (HDI components)

	(1) Nature Sample 5-Year Interval (balanced) 1980–2009	(2) Nature Sample Annual (balanced) 2000–2009	(3) Total Sample 5-Year Interval (balanced) 1980–2009	(4) Total Sample Annual (balanced) 2000–2009	(5) Total Sample 5-Year Interval (unbalanced) 1980–2009	(6) Total Sample Annual (unbalanced) 2000–2009
Education Component						
Pre	−7.688**	−3.172**	−4.655**	−3.252**	−3.839**	−3.143**
	(1.734)	(1.419)	(0.516)	(0.392)	(0.675)	(0.371)
Post	0.145	0.136	2.640**	1.600**	2.759**	1.620**
	(0.711)	(0.323)	(0.459)	(0.571)	(0.437)	
Observations	209	319	522	1,143	764	1,317
R^2	.372	.302	.638	.399	.580	.386
Threshold value	0.45	0.72	0.63	0.64	0.56	0.64
Standard-of-Living Component						
Pre	1.004	0.484	0.798	−1.436**	0.441	−1.970**
	(1.042)	(0.450)	(0.620)	(0.405)	(0.364)	(0.436)
Post	7.483**	−1.868†	10.58**	1.170**	10.74**	1.149**
	(2.195)	(1.459)	(2.038)	(0.335)	(1.817)	(0.278)
Observations	202	324	522	1,143	848	1,451
R^2	.392	.254	.558	.319	.537	.361
Threshold value	0.77	0.89	0.77	0.50	0.77	0.50
Health Component						
Pre	−10.48**	7.841**	−0.867	−1.911**	−0.954	−2.286**
	(4.438)	(2.858)	(0.725)	(0.495)	(0.658)	(0.436)
Post	−0.660	10.81**	15.12**	9.933**	14.54**	12.39**
	(3.364)	(3.095)	(1.375)	(1.072)	(1.187)	(0.990)
Observations	216	324	522	1,143	984	1,488
R^2	.341	.278	.604	.408	.527	.423
Threshold value	0.87	0.94	0.87	0.82	0.87	0.90

Note: Robust standard errors are in parentheses.

Sources: UNDP (2011); World Bank (2011); authors' calculations.

$^{\dagger}p < .10$; $*p < .05$; $**p < .01$

threshold value and insignificant above it. For the annual data, the threshold value is 0.72, and the relationship is still negative below the threshold value and insignificant above it. For the balanced and unbalanced samples, the relationship is negative below the threshold value and positive above it. Again the threshold values are implausibly small (between 0.56 and 0.63).

The magnitude of the threshold values for the standard-of-living component is comparable with those of the HDI. For the Nature sample, the relationship is insignificant for HDI levels below the threshold value; above the threshold value, the relationship is positive for the five-year data and negative for (the more important) annual data. For the five-year data, both in the balanced and the unbalanced samples, the relationship between standard of living and the TFR is insignificant below the threshold value and positive above it. It is only for the annual data that we observe a reversal in the relationship, with a negative coefficient below the threshold value and a positive coefficient above it. However, once again, the threshold value is implausibly small (0.50), and we thus interpret this finding as a statistical artifact.

In both the balanced sample and the unbalanced sample, the relationship between health and the TFR reverses from negative to positive at index levels between 0.82 and 0.90. For the Nature sample, the relationship is negative below the threshold value and insignificant above it for the five-year data; it is positive throughout for the annual data.

Conclusions

We reinvestigate the finding of MKB that the relationship between the HDI and the TFR reverses from negative (i.e., increases in HDI are associated with decreases in TFR) to positive (i.e., increases in HDI are associated with increases in TFR) at an HDI level of 0.86. We find that the reversal in the HDI-TFR relationship is robust to neither the UNDP's recent revision of the HDI calculation method nor the decomposition of the HDI into its subindices of education, standard of living, and health.

Our results confirm MKB's finding in the sense that the association between the HDI and the TFR has changed over the past 20 to 30 years. However, we also document that their conclusions overreach a bit. We find very little support for simple interpretations that fertility rates will automatically start to increase beyond a certain level of development. We think that it is necessary to investigate the micro-level reasons for the recent increase in fertility rates in some high-income countries.

In addition, our results show the need for caution in interpreting empirical findings. In our case, small changes in the methodology of calculating the HDI and small changes to the country sample changed the conclusions. Thus, empirical results should be interpreted carefully unless their robustness has been proven with different samples and indicators.

Acknowledgments For their valuable comments and suggestions, we thank Stephan Klasen, Klaus Prettner, and Holger Strulik; three anonymous referees; the Editor, Stewart E. Tolnay; and participants of the 2013 Alp-Pop Conference.

References

Myrskylä, M., Kohler, H.-P., Billari, F. C. (2009). Advances in development reverse fertility declines. *Nature, 460,* 741–743.

UNDP (2010). *Human development report 2010. The real wealth of nations. Pathways to human development*. New York: UNDP.

UNDP (2011). *International human development indicators*. New York: UNDP.

World Bank (2011). *World development indicators* [CD-ROM]. Washington, DC: World Bank.